

Reaction Type Lab

Background Information:

This lab discusses types of reactions and replaces traditional reactions involving chemicals such as lead (II) nitrate, barium chloride, and silver nitrate.

You will ultimately learn the difference between composition, decomposition, single displacement and double displacement reactions.

Safety Information:

Hydrochloric acid (HCl) is a skin irritant and if it comes into contact with the skin it should be washed with soap and water. Lead (II) Nitrate is a skin irritant and if it comes into contact with the skin should be washed with soap and water. Reaction "Type C" includes using a wooden splint to test for the generation of gases. Part C, D involves the use of a Bunsen burner, use proper laboratory safety when using the Bunsen burner.

Pre-lab questions

For each of the following experimental procedures and observations;

- a) Write a balanced chemical equation,
- b) Name the product
- c) Identify the type of reaction.

1. A student heats barium metal over a flame, and begins to react with oxygen gas in the air. A white, crystalline solid begins to form on the barium.
2. A chemist mixes lead (II) nitrate and potassium iodide solutions (both of which are clear liquids) and mixes them. A yellow precipitate appears in the final solution. The remaining liquid is an ionic solution. Solid precipitates containing lead are always yellow.
3. Magnesium metal is placed in sulfuric acid. The solution begins to bubble. The remaining liquid is an ionic solution.
4. Water is placed in an electrolysis machine. The water placed in the machine begins to bubble. The gas is collected in two separate containers. It is noticed that when a glowing splint is placed in one gas, it flames up. In the other gas, a glowing splint produces a small popping sound signifying a tiny explosion.

Materials

3 test tubes
steel wool
copper (II) chloride solution
rubber stopper
crucible tongs
calcium carbonate chips
lead (II) nitrate solution
Potassium iodide
Graduated cylinder
Catalayse/potato piece

Dilute hydrochloric acid
Zinc strip
Bunsen Burner
Copper wire
Bunsen burner
Flint lighter
Crucible tongs
Test tube rack
Flint striker
Hydrogen peroxide (5-6%)

Procedures:

Reaction type A

1. Place a sample (10 mL) of dilute hydrochloric acid solution in a test tube.
2. Take a piece of zinc and sand it with the steel wool.
3. Record physical properties of both the solution and the zinc metal.
4. Place the zinc metal in the test tube. Record your observations. Complete Reaction type B and then return and observe the test tube again

Reaction type B

1. Obtain a sample (5mL) of lead (II) nitrate. Place it in a test tube. Record its physical properties.
2. Take a sample (5mL) of potassium iodide. Record its physical properties.
3. Mix the two solutions in the test tube. Observe and record the outcome.
4. Leave the test tube in the test tube rack. Complete Reaction type C and then come back and look at the test tube to make sure your observations are complete

Reaction Type C

1. Take a sample (10mL) of hydrogen peroxide. Place it in a test tube.
2. Add a small sample of potato/catalayse into the test tube. Quickly place the rubber stopper LIGHTLY onto the test tube.
3. Observe what is happening. Allow the reaction to carry on for about 10 seconds.
4. Light a wooden splint using the burner.. When the splint has burnt the a bit, blow out the flame. The splint should be glowing. Take the stopper off the test tube and place the glowing splint into the test tube.
5. Observe what happens to the splint.

Reaction Type D

6. Take a small piece of copper wire and hold it at one end using the crucible tongs.. Record its physical properties.
7. Place the opposite end of the wire into the hottest part of the flame in the Bunsen burner (the blue part) for 30 s.
8. Remove the wire and examine it. After the wire is cooled, scrape the surface with the edge of a scoopula.

Observations of Reactions:

Reaction Type	Observations Before Reaction (physical properties):	Observations After Reaction:
A		
B		
C		
D		

Post lab Questions:

1. For each reaction that you did, write a balanced chemical equation:
2. For the products identified in your chemical equations, match the physical observations you made to the products predicted by your chemical equation (FOR EXAMPLE: If your reaction were to produce a yellow precipitate, then you would have to say: *In Part X, the yellow precipitate formed was lead (II) iodide*). Complete for all parts in the lab. (HINT: compounds containing the polyatomic ion carbonate and large metal cations ARE NOT SOLUBLE AND WILL FORM A PRECIPITATE)
3. Identify the types of reactions seen this lab.
4. How do you know chemical changes occurred in each reaction?
5. If you were to mass the reactants before the reaction and then mass the products after the reaction, what would you expect to find? Why? How is this related to balancing your equations?